



RETAINING WALLS WITH LEVEL BACKFILL

Construction of Retaining Walls, except those lower than 3' in height and not supporting surcharge, requires a permit and is regulated by the State Building Standards Code with County of San Diego Amendments. This form outlines the County's requirements. Form DPLU #83 provides information on retaining walls with sloping backfill.

I. INSPECTIONS

Please call for inspections at the following times:

1. When the footing excavations have been completed, the reinforcing steel has been securely tied into final position, and before the placement of concrete.
2. When the block has been laid and the reinforcing steel is in position, but before any grout has been placed. Steel is to be securely fastened in place to prevent movement during grouting. Lifts are not to exceed 6' high and blocks are not to be laid higher than the grout pour.
3. After grouting is completed and after rock or rubble wall drains are in place, but before backfill is placed.
4. When all work has been completed.

II. WALL HEIGHT

Wall height is measured from the top of the footing to the top of the wall. Walls that are not specifically shown in this form or on any other County forms must be designed by a California licensed architect, civil or structural engineer. No building foundation, driveway or other loading on the upper level is allowed within a distance equal to the height of the wall. Walls with such loading must be designed by a California licensed architect, civil or structural engineer.

III. BLOCK

All block must be type "N" grouted solid with $f'_m = 1500$ psi.

IV. CONCRETE MIX DESIGN

The concrete mix for footings must meet the strength of $f'_c = 2000$ psi minimum, or meet the following proportions:

1 part Portland cement	3 1/2 parts 3/4" maximum-sized gravel
2 1/2 parts sand	with not more than 7 gallons of water per sack of cement

V. MORTAR MIX DESIGN

The mortar mix for block placement must meet a minimum compressive strength of 1800 psi, or meet the following proportions:

1 part Portland cement	1/4 part hydrated lime or lime putty
3 1/2 parts sand	

NOTE: the use of plastic cement is not permitted for mortar.

VI. GROUT MIX DESIGN

Grout used for filling block cells must meet a minimum compressive strength of 2000 psi, or meet the following proportions:

1 part Portland cement
3 parts sand

2 parts pea gravel (3/8" aggregate)
with water added to pouring consistency without
segregation of the grout aggregate

Rod or vibrate immediately. Re-rod or re-vibrate grout about 10 minutes after pouring to insure solid consolidation. Stop grout 2" from top of masonry units when an additional grout lift is required.

NOTE: the use of plastic cement is not permitted for grout.

VII. MORTAR KEY

To insure proper bonding between the footing and the first course of block, a mortar key must be formed by embedding a flat 2" x 4" flush with and at the top of the freshly poured footing. It should be removed after the concrete has started to harden (about one hour). A mortar key may be omitted if the first course of block is set into fresh concrete when the footing is poured and a good bond is obtained.

VIII. WALL DRAINS

Wall drains, four inches in diameter, must be placed at 6' intervals along the length of the wall and located at the level of the bottom course of block. The drains may be formed by placing a block on its side at 6' intervals or by leaving out the mortar in the vertical spaces between all the blocks (head joint) in the first course. Backfill behind wall drains or open head joints must be loose rubble or gravel. Alternative drainage systems may be allowed, if approved by the plan check group of the County of San Diego, Department of Planning and Land Use.

IX. SOILS

All footings must extend at least 12" into undisturbed natural soil or compacted fill which has been compacted to at least 90% density. Soil should be dampened prior to placing concrete footings. A soils report, compiled by a licensed engineer, may be required. Footing sizes given in this handout are based on 1000 psf maximum soil bearing value; use of different bearing values will require design by a licensed architect, civil or structural engineer specifically for the existing conditions and may also require a soils report.

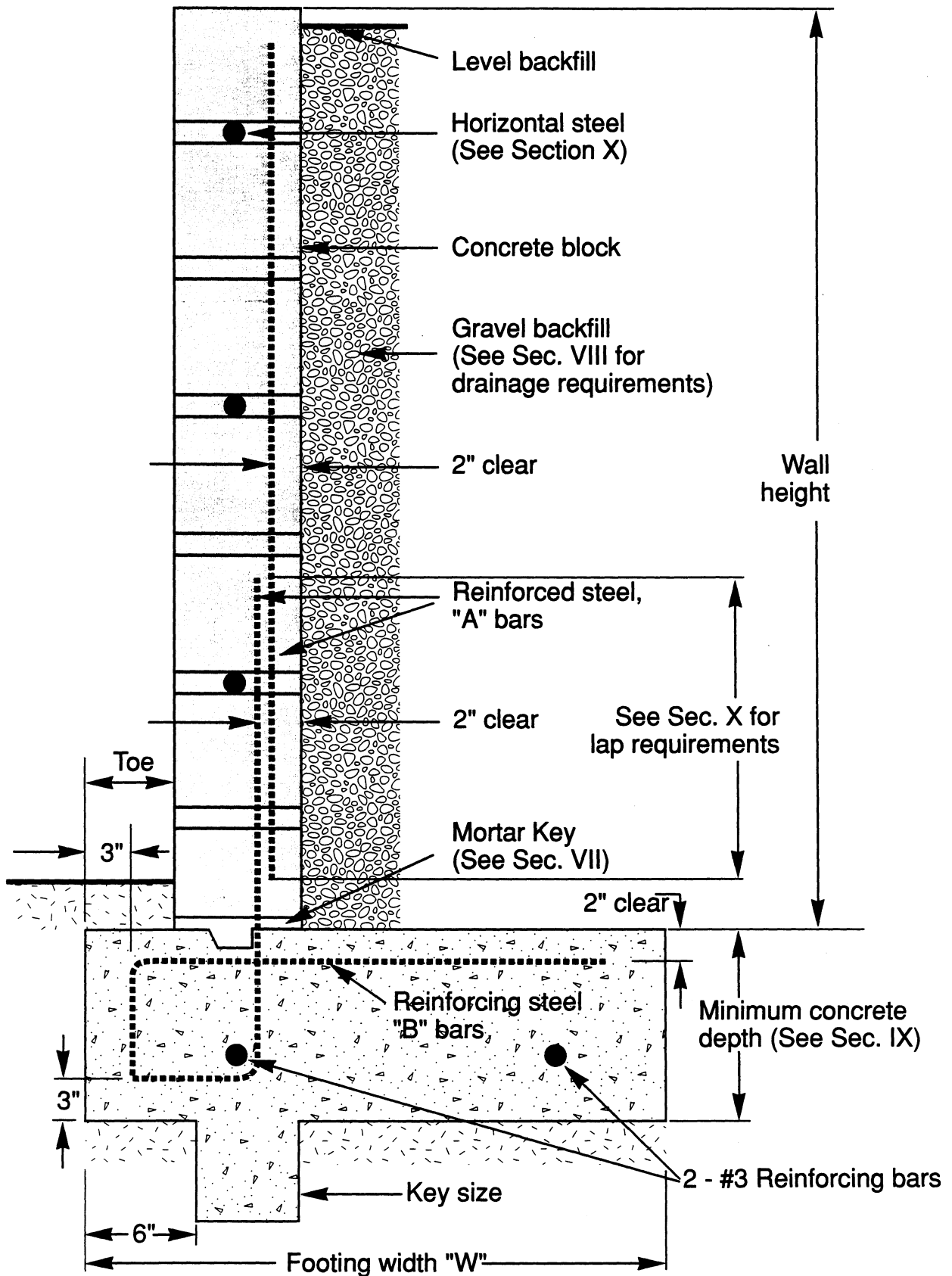
X. REINFORCING STEEL

Reinforcing steel must be deformed and comply with ASTM specification A615-85, Grade 40 or 60. When one continuous bar cannot be used, a lap or splice of 40 bar diameters is required. Two #3 bars, minimum, must be placed longitudinally in the footing as shown. For 6" and 8" blocks one #3 bar must be placed longitudinally in the center of the wall in a mortar joint every 16" as the blocks are laid up. For 12" blocks one #4 bar must be placed longitudinally in the center of the wall in a bond beam block course every 16" as blocks are laid up.

TABLE A

Wall height	Wall type	Toe	Footing width	Key size	Reinforcing Steel	
					A bars	B bars
1' - 4"	III	2"	1' - 3"	None	#3 @ 24" o/c	None
2' - 0"	III	2"	1' - 6"	None	#3 @ 24" o/c	None
2' - 8"	III	3"	1' - 10"	None	#3 @ 24" o/c	#3 @ 48" o/c
3' - 4"	III	4"	2' - 1"	None	#3 @ 24" o/c	#3 @ 48" o/c
4' - 0"	IV	6"	2' - 6"	None	#4 @ 24" o/c	#3 @ 32" o/c
4' - 8"	IV	11"	2' - 11"	None	#4 @ 24" o/c	#4 @ 24" o/c
5' - 4"	IV	12"	3' - 2"	6" x 6"	#4 @ 16" o/c	#4 @ 24" o/c
6' - 0"	V	16"	3' - 10"	8" x 8"	#4 @ 16" o/c	#4 @ 24" o/c
6' - 8"	V	16"	4' - 4"	8" x 8"	#4 @ 16" o/c	#4 @ 16" o/c
7' - 4"	V	16"	5' - 0"	12" x 12"	#5 @ 16" o/c	#4 @ 16" o/c
8' - 0"	V	20"	5' - 8"	12" x 12"	#6 @ 16" o/c	#4 @ 16" o/c

TYPE III WALL - 6" BLOCK
TYPE IV WALL - 8" BLOCK



NOTE: The leading edge of all retaining wall footings to be 7' 0" minimum from face of slopes where the ground slopes away from the wall.

Technical drawing of a retaining wall cross-section, showing various components and dimensions:

- Level backfill**: Indicated at the top right.
- 2" clear**: Dimension for the gap between the wall face and the backfill.
- #4 bars at 16" o/c**: Vertical reinforcement bars in the upper section.
- Horizontal steel (See Sec. VIII for applications)**: Reinforcement in the upper section.
- 5' maximum 8" concrete block**: Dimension for the upper section of the wall.
- Gravel backfill (See Sec. VIII for drainage requirements)**: Indicated in the middle section.
- Reinforcing steel "A" bars**: Vertical reinforcement bars in the middle section.
- 2 1/2" clear**: Dimension for the gap between the wall face and the backfill in the middle section.
- 12" concrete block not less than 32"**: Dimension for the middle section of the wall.
- Mortar key (See Sec. VII)**: Indicated in the middle section.
- Reinforcing steel "B" bars**: Vertical reinforcement bars in the lower section.
- Toe**: Dimension for the base of the wall.
- 2" clear**: Dimension for the gap between the wall face and the backfill at the base.
- 3"**: Dimension for the base of the wall.
- 12" minimum concrete depth (See Sec. IX)**: Dimension for the base of the wall.
- Two #3 bars typical horizontal**: Horizontal reinforcement bars in the base.
- 12"**: Dimension for the base of the wall.
- Key size**: Dimension for the base of the wall.
- Footing width**: Dimension for the base of the wall.
- Wall height**: Overall dimension of the wall.

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